

**National Tsunami Hazard Mitigation Program  
Warning Coordination Subcommittee Meeting Notes**

1:30pm-5:30pm; January, 26, 2010

Magnolia Room, Sheraton Hotel, Pasadena, California

Attending co-Chairs: Jim Goltz, Chip McCreery, and Paul Whitmore

**Participants:**

Melinda Bailey	NOAA/NWS/SR
Eddie Bernard	NOAA/PMEL
Tamra Biasco	FEMA
Diane Burden-Cox	Disaster Scope, Inc.
Graeme Cox	Disaster Scope, Inc.
Paula Dunbar	NOAA/NGDC
Jim Goltz	State of California
Dwane Hubert	State of Maine
Laura Kong	NOAA/NWS/ITIC
Lewis Kozlosky	NOAA/NWS/OCWWS
Tom LeBlanc	State of Texas
Manaea Lenta	American Samoa
Kate Long	State of California
Jeff Lorens	NOAA/NWS/WR
Chris Maier	NOAA/NWS/OCWWS
Charles McCreery	NOAA/NWS/PTWC
Don Miller	NOAA/NWS/ER
Erv Petty	State of Alaska
Bill Proenza	NOAA/NWS/SR
Jen Rhoades	NOAA/NWS/OCWWS
Kevin Richards	State of Hawaii
Carven Scott	NOAA/NWS/AR
John Schelling	State of Washington
Althea Turner	State of Oregon
Von Hillebrandt	U. Puerto Rico
Robert Ward	State of Maryland
Paul Whitmore	NOAA/NWS/WCATWC
Brian Yanagi	NOAA/NWS/ITIC

**Introductions**

Whitmore reviewed 11/2008 meeting Action Item

1. Complete Atlantic Warning Criteria Review and send to WCS members.
  - a. Criteria Review published in Tsunami Hazards Journal V28, #2, 2009 (posted at [www.sthjourn.org](http://www.sthjourn.org)).

- b. This completes the two external reviews of the WCATWC warning/watch/advisory criteria – Pacific review completed in 2008.
- 2. Develop and implement procedures to use Hurricane Hotline during Atlantic w/w/a events.
  - a. Completed 1/30/2009.
  - b. Hotline installed at both WCATWC and PTWC.
- 3. Determine date for Atlantic exercise in 2009.
  - a. Done – April 2, 2009.
- 4. Create LANTEX09 handbook, distribute to WCS, and execute Atlantic exercise.
  - a. Final handbook completed and distributed January 16, 2009.
  - b. Exercise conducted on April 2, 2009.
- 5. State partners distribute LANTEX09 handbook to counties and communities. NWS ER and SR tsunami program managers distribute to coastal WCMs. WCATWC coordinate with Storm Prediction Center in Canada.
  - a. Many pre-event telcons conducted by main team.
  - b. WCATWC conducted tsunami warning system training Webinar with approximately 70 groups of listeners.
  - c. NOAA issued press release in late-March.
  - d. Eastern Canada considered participation, but did not.
- 6. Obtain tsunami.gov requirements from WCS members.
  - a. Request for suggestions sent out – few suggestions received.
  - b. Tsunami.gov development included in part of the TWC IT Modernization project.
  - c. Development of portal started in December, 2009.
  - d. More discussion later in meeting on TWC IT Modernization.
- 7. Develop implementation plan and date to implement new advisory definition and product in Hawaii.
  - a. McCreery working with HCD – implementation set for April 1, 2010.
  - b. Chip to discuss more later.
- 8. Develop plan to convert usage of WCATWC break points to NWS public zones.
  - a. Basic plan developed and to be discussed during this meeting.
- 9. Change “No-repeat No- tsunami warning...” statement to new wording approved in meeting.
  - a. Done – implemented 12/08.
- 10. Move w/w/a definitions below quake information.
  - a. Done – implemented 12/08
- 11. Add break points to “For information only...” section of w/w/a messages.
  - a. Done – implemented with VTEC in 6/2009.
  - b. NOTE – Valid Time Event Codes added to domestic tsunami w/w/a in 6/2009. First used during Samoa event.
- 12. Add scenario repository to WCATWC web site in non-public-linked location. Provide link to WCS.
  - a. Done – scenarios available at [wcatwc.arh.noaa.gov/scenarios/index.php](http://wcatwc.arh.noaa.gov/scenarios/index.php).
- 13. Propose changes to Terms of Reference to NTHMP CC.
  - a. Done – accepted during CC meeting.

- b. NOTE – WCS Terms of Reference listed in the NTHMP Rules of Procedure.
- 14. Develop plan for a Pacific exercise based on LANTEX09 material for presentation at next subcommittee meeting.
  - a. Done – LANTEX10 and PACIFEX10 to be conducted March 24, 2010.
  - b. More discussion on these exercises later.
- 15. Develop WCS requirements for post-event survey.
  - a. Surveys completed by Jim Goltz and Walter Diaz and posted to NTHMP web site.
  - b. Two surveys developed: one for general public and one for emergency management

McCreery discussed the Hawaii tsunami advisory definition change

- In addition to using the new advisory definition, PTWC is updating the Hawaii product to better match NWS format.
- An NWS Service Change Notice will be issued prior to the change.
- Advisory definition will be the same as CONUS/Alaska.
- More comprehensive ETAs to be used in message.
- Improving HAWAS message.
- Narrative statement of key information as lead.
- This Hawaii product will be basis for new Am. Samoa and Guam.
- Chip showed examples of new Hawaii message.
  - Much discussion on advisory product.
  - Used during Samoa response for Hawaii.
- Paul W.: Lots of products to issue during an event, can PTWC do that many? Chip – we will just have to deal with it – four total products.
- ACTION: Issue Service Change Notice 30 days prior to new definition implementation.

Samoa Tsunami Response

- McCreery discussed PTWC response for Samoa event.
  - Routine operations at PTWC; first issued observatory message in 8 minutes.
  - Warning issued 16 minutes after event.
  - Density of seismic network limited response time.
  - PTWC discussed event with WFO prior to warning issuance.
  - WSO Pago Pago used CISN – activated EAS based on the M7.9 received through CISN.
- Jeff Lorens described the U.S. west coast response to the WCATWC tsunami advisory.
  - First ever issuance of the new advisory product.
  - No damage injuries or major impacts.
  - In effect, a great exercise.
  - Overall response – very positive. Fills need for heightened awareness but no need for evacuations.
  - Good lead time.
  - Conference calls between WCATWC and WFOs and States – Big Plus.
  - Local statements – another plus – good additional information.

- Comment: Conference call BEFORE Advisory very helpful!
- Marine zone boundaries not matching with tsunami breakpoints caused some misunderstanding along southern Washington coast.
- Advisory included OR and CA but not WA, but Marine Zone used crosses the breakpoint and extends into WA which was not in an Advisory.
- Recommend removal of Marine Zones (UGCs) from WCATWC Tsunami Bulletins for the Pacific.
- ER and SR want to retain Marine Zones.
- PTWC does not include marine zones in Hawai'i.
- Some Pacific Marine Zones could be retained in Pacific for special circumstances (e.g., strong currents in SF Bay).
- Comment: Why not change Marine Zone boundaries. Jeff L. – Decided not to because mariners know current boundaries.
- Comment: Jim Goltz – CA alerted initially through CISM display. Noted that Hawaii under Watch initially. Call to WCATWC about CA hazard. San Luis Obispo and Crescent City most likely threat. Call to those counties to alert. Held California conference calls once Advisory issued. Up to 100 people on Conference Call.
- Brian Y: Are conf calls in SOPs? Answer: yes.
- Christa: Can TWCs handle long conference calls? Paul: Yes, since not required until third message.
- Do telecons reduce calls to TWCs? Paul W. – Phone still rings often, but telecons reduce important calls from EMs and WFOs.
- Christa: Did people really get off the beaches for Advisory? WA uses voice broadcast on All Hazards Alert (AHAB), CA, AK, OR no sirens or EAS.
- Brian Y: Advisory covers grey area of the science.
- General discussion on difficulty of keeping everyone aware of and prepared for changes such as Advisories.
- NWS is completing an assessment of the NWS actions taken during the event.
  - ACTION: Notify WCS when assessment is complete and provide link to findings.
  - Jen: Assessment could be released by about May 2010.
  - Paul: Since it was noted that people understood they should move to high ground after shaking but didn't, would sirens provide the confirmation to evacuate after ground shaking?
  - Brian Y: Went to Japan, Osaka. When ground shakes strongly they activate equivalent of EAS and start evacuation procedures. But what about cry wolf.
  - Eddie: In 2003 Hokkaido tsunami, people didn't evacuate because of cry wolf problem.

#### Recent N. California 6.5 coastal event

- Jim Goltz: 6.5 event southwest of Eureka.
- WCATWC Tsunami Information Statement issued 4 minutes after event.
- People didn't get word about no tsunami threat.

- People were running while ground was moving (should drop, cover, hold) - more people movement, more injuries.
- A lot of spontaneous evacuation for fear of tsunami. But people drove and created traffic jams. NWR only had weather reports.
- HI procedure – anything over M5.0 – WFO issues a “no-tsunami” message to activate EAS/NWR.
- Jim: Retrofit of older masonry buildings seem to have worked well. Loss estimate is 25-35M. 0.3-.4g ground acceleration.
- Comment from Samoa DHS. Sirens now being installed in Am. Samoa for ~\$2M.
- Christa: Haiti earthquake damage the focus, but tsunami was generated. Spanish TV saying there is tsunami warning for entire Caribbean - caused confusion.

### Tsunami Warning System Exercises

- Whitmore discussed last year’s LANTEX09 Atlantic tsunami exercise.
  - This was the first U.S. Atlantic-wide exercise.
  - WCATWC conducted a well-attended training webinar prior to the exercise.
  - Who participated?
    - Von Hillebrandt discussed participation in Puerto Rico which was extensive - 30 of 40 coastal communities participated.
    - Several counties in Florida organized table top exercises.
      - Melinda: In Melbourne FL they participated.
    - Robert Ward organized an east coast meeting and exercise for several state-level participants from 5 states.
      - Used meeting for mini-drill with exercise scenario. 2 objectives: review communication and review plans or procedures.
      - Make sure how to understand what messages mean.
      - Messages long - which place on message appropriate to go to first.
      - Mostly are used to hurricane response and can organize and participate in conference call.
      - Tsunami only gives 2 hours so not enough time for good response.
      - How to get 350,000 people to fit on boardwalk or hotel big problem.
      - Maryland, N. Car., S. Carolina, Delaware participated and provided good opportunity to understand messages, ask questions.
  - Problems:
    - Some confusion with press about scope of exercise. Press release caused some confusion.
    - Some east coast EMs were unaware of the exercise which led to some embarrassment when media informed them of the event.
    - Melinda: First product didn’t go out but some WFOs waiting on product. Paul: problem with initial message. Had to resend 5-10 min later.

- One NTHMP strategic plan milestone for the Sub-Committee is to organize a tsunami exercise for U.S. participants starting in 2010. LANTEX09 started the process one-year early.
- Whitmore discussed national tsunami exercises planned for 2010. LANTEX10 is the Atlantic exercise and PACIFEX10 is the Pacific exercise.
  - Both to be held on March 24, 2010.
    - LANTEX10 at 1300UTC
    - PACIFEX10 at 1700UTC
  - Hopefully, this will coincide with a nationally designated tsunami awareness week.
  - LANTEX will simulate a 7.5 earthquake off New England with an associated continental shelf slump. (like 1929 Grand Banks earthquake. Simulation produces significant wave all the way to Puerto Rico).
  - PACIFEX will simulate a 9.0 earthquake and associated large tsunami generated off the Alaska Peninsula.
  - Long term goal is to make this truly a national exercise and get more communities involved.
  - Both Handbooks are available on front page of the WCATWC web site.
  - Level of participation is completely up to organizations playing along with the event.
    - Most in LANTEX09 performed table top exercises.
    - Puerto Rico included comms. test and evacuation exercises.
  - NOAA will issue a press release one-to-two weeks prior to the exercise.
  - WCATWC and ITIC are planning 3 one-day training sessions along the east coast (Massachusetts, New Jersey, and North Carolina) to help prepare emergency management for the exercise and to provide general TWS information.
  - A dummy message will be issued by the TWCs over normal communications channels to trigger the exercise.
  - Note that this is also the day for the Alaska and California live code tests.
  - Does the group feel these national exercises are a worthwhile effort?
    - Several WCS members stated yes, they are necessary.
    - Kevin Richards indicated participating in these exercises completes a FEMA requirement.
  - ACTION – Issue NOAA Press Release for exercise 1-2 weeks in advance of exercise date.
  - ACTION - State WCS EM reps. will distribute the handbook to county and local EM agencies.
  - ACTION – NWS Regional Tsunami Program Managers will distribute the handbook to coastal WCMs for further distribution to county/local emergency management agencies.
  - ACTION – WCATWC will coordinate the 2010 exercises with the Canadian Atlantic Storm Prediction Center and British Columbia Provincial Emergency Preparedness.
  - ACTION – Decide on date for 2011 exercises by July, 2010 and send this to WCS.

- ACTION – Develop exercise handbooks for 2011 exercises before 2011 WCS Annual meeting.
  - ACTION – Contact American Samoa about exercise participation (Jacinta Brown).
  - Jen – No conflict with USCG in spite of earlier concerns.
- Goltz discussed March, 2009 live code test in California.
  - First time in 2008 with one county (Humboldt). Did a lot of preparation. By day of test people were talking about it extensively. No sirens or evacuations. Was a success.
  - Del Norte, Humboldt, and Mendocino Counties participated in the test in March 09.
    - Coordination with Oregon's Curry County and State EM due to broadcast overlap.
    - Humboldt County tested sirens and other dissemination devices.
  - Generally a very successful test.
- Erv Petty/Jeff Osiensky discussed March, 2009 test in Alaska.
  - Coincided with Alaska's Tsunami Awareness Week.
  - First time in three years live codes had been used.
  - Lots of coordination among NWS, State EMs, DoD, USCG, FEMA, media, and communities.
  - 103 public and EM responses to web-based feedback form.
  - Several issues identified.
- Live code test plans for 2010:
  - Goltz discussed the live code test planned for March 24, 2010 10:15am PDT for the same three counties in Northern California (same date as PACIFEX10).
    - Wanted to add Sonoma and Marin counties, but put off due to H1N1 concerns.
    - Will do same 3 counties plus Indian Tribes in those areas.
    - Will also attempt to get State Proclamation for Tsunami Awareness Week.
    - If entire CA coast participates, then can get state proclamation.
  - Erv Petty discussed the statewide live code test in Alaska planned for March 24, 2010 at 9:45am ADT.
    - Tsunami code also activates in inappropriate places such as Fairbanks. Need better equipment to isolate code to coastal communities.
    - Tiny communities in Alaska have small number of EM, Police, and Fire. May be out of town when tsunami occurs. Good to practice live code test when they are gone.
    - Last month did live code test for Emergency Alert Notification (from White House). 3-min non-stop of "This is a test."
    - Need FCC waiver for live code test (Jim G. has example form). Only found out about this requirement 3 weeks before CA live test.
- Jeff Lorens discussed the planned September 15, 2010 west coast comms. test.
  - West Coast Comms. test is not a live test (does not use live EAS codes).
  - Emphasis is to test the NWS comms. pathways.

- The test uses the EAS routine monthly test code.
- Next test will be held September 15, 2010 10:15am PDT.
- Kong (ITIC) discussed the plans for future PacWave international tsunami exercises.
  - Previous exercises conducted in 2006 and 2008.
  - Kevin: Important to have plenty of lead time. In PACWAVE06 was at same time as hurricane exercise (Makani Pahili).
  - ACTION: Laura Kong to notify WCS co-chairs when decision is made for the next international Pacific tsunami exercise.
- Von Hillebrandt discussed plans for an international Caribbean exercise in 2011
  - Will seek approval for exercise from upcoming ICG in March 2010.
  - Proposed to combine this exercise with LANTEX 11.
  - Agreed to hold this on the Wednesday of Tsunami Awareness Week which is the week starting on the 4<sup>th</sup> Monday of March.
- Any other exercises going on?
  - Kevin R.: FEMA requires 5 major exercises per year to receive funding, so plenty of opportunities.
  - Carven Scott: Should engage the military, especially because of the regular rotation of personnel.
  - Kevin: Can be overwhelming with military because they are too big and very interested. Have to use single point of contact.
  - Eddie: need to include Coast Guard. Handled by WFO interactions.
  - ACTION – Find appropriate contact for military participation and alert them to exercise.

Whitmore discussed conversion of tsunami w/w/a breakpoints in west coast and Alaska to public zones boundaries.

- Identified as an action at last WCS meeting to develop plan to change existing breakpoint system.
- Samoa event highlighted problems with zone boundaries not matching breakpoints used in messages.
- Clear problem for the marine zones, but also potential problem for public (onshore) zones.
- Further problem in Alaska is that towns are used, sometimes leading to confusion as to whether a town is in or out of a w/w/a.
- In some areas, w/w/a regions could be finer grained than present breakpoints allow.
- Proposed Plan:
  - Adopt use of public zone boundaries in Alaska and west coast as tsunami w/w/a break points.
  - NWS Instruction 10-701 must be updated.
  - Eliminate use of marine zones in WCATWC Pacific products except possibly in a few cases where zone will be fully included within breakpoints.
    - This will ensure that text message matches any graphics displayed of w/w/a regions.



- This will also provide finer granularity for warning on the west coast.
  - In areas where public zone boundaries are not well known points, also refer to a nearby city in text message.
  - NOTE: PTWC domestic products do not include marine zones.
- For U.S. east and Gulf of Mexico coasts, make no changes to existing breakpoints
  - Existing breakpoints in these areas match both public and marine zone boundaries
  - Leave marine zones in products in this region.
  - The existing breakpoints provide sufficient granularity for the threat given present knowledge of tsunami sources in that region.
- Tsunami w/w/a zones should be further subdivided in Puerto Rico and the Virgin Islands.
  - Here, the threat is better understood and an increase in granularity of w/w/a zones would provide a benefit for the region.
  - Use Public Zone boundaries for tsunami w/w/a breakpoints in PR/VI.
- ACTION: Create and issue SCN to:
  - 1 – Remove marine zones from WCATWC Pacific products
  - 2 – Align w/w/a breakpoints with public zone boundaries along Alaska and the west coast.
- ACTION: WCATWC work with PRSN to refine w/w/a criteria for the PR/VI region based on finer grained w/w/a zones using public zone boundaries as breakpoints in PR/VI.
- ACTION: Create and issue SCN describing implementation of new PR/VI breakpoints if there will be a change.
- Melinda: If change for Puerto Rico, then maybe should do east coast and gulf coast.
  - Paul: This was considered in the Atlantic criteria review. Reviewers felt considering the knowledge of sources and threats in the region, the existing breakpoints are good.

#### Tsunami Warning Center products

- Whitmore queried group as to how long in advance should w/w/a be issued for a coast.
  - Better forecast methods and sea level observations allow TWCs to delineate threat earlier than in the past.
  - For example, during Samoa tsunami California and Oregon were put into an advisory status six hours in advance of wave arrival.
  - How much is too much advance notice for a tsunami warning or advisory?
    - Comments: Some may need as much time as possible. Estimated time to evacuate – alert public, clear roads, etc. is minimal.
    - After discussion, consensus is that warning should be issued as soon as it threat is determined, even if it is many hours (even up to 14) before impact. (NO ACTION – this is present procedure).
- Whitmore led discussion on tsunami amplitude forecasts inclusion in tsunami products.
  - WCATWC has output forecasts to web site three times (once in 1997, once in 2007, and once in 2009).

- Specific forecasts were not listed in official NWS products, though in 2009 general levels and timing of peak were provided.
- When forecasts are available, how should the information be provided?
  - Will relatively small forecasts induce limited response?
  - Should inundation levels for specific communities be provided on the web?
  - Should forecast uncertainty be discussed in product?
  - Should official products just provide expected impact as they do today?
- Paul: no adverse reaction to a few times they have put in message.
- Laura: Would it make a difference if a big forecast vs. recent small forecasts?
- Lots of discussion on this topic. Consistency of information an issue. Does forecast change over time? Use range of values in forecast? Forecast inundation or wave height? Special product with detailed forecast to EMs only?
- Laura: Which product gets most viewing – standard product or public product?  
Paul: Standard product, even among public.
- Consensus is to provide all information to primary customers (emergency managers, WFOs, USCG) through tsunami.gov portal. Still must consider which information to provide to public. May be better to issue impact information to public.
- Whitmore mentioned changes to w/w/a criteria over the last year and proposed criteria changes.
  - Should any distant event magnitude 7.9 or greater start with a TIS which requires a supplemental TIS?
    - ACTION: Adjust procedures so that all 7.9 or greater, distant events which trigger issuance of WCATWC TIS require supplemental TIS and state the event is being evaluated.
  - Magnitude threshold for issuing TIS for offshore events
    - Presently, in Pacific 5-5.9 events must be within 150km of coast.
    - 4-4.9 must be within 50km of coast to issue TIS.
    - In Atlantic all offshore events 5-5.9 in AOR trigger TIS.
    - In PR/VI region all events 4 or greater trigger a TIS.
    - Should Atlantic criteria be extended to Pacific?
    - ACTION: Adjust criteria so that Pacific TIS criteria mimic that of the Atlantic.
- Product content proposed changes.
  - Several suggestions for product wording improvement have come from WCMs visiting the WCATWC for TWS training sessions.
  - The Evaluation statement in initial WCATWC products states "IT IS NOT KNOWN - REPEAT NOT KNOWN - IF A TSUNAMI EXISTS BUT A TSUNAMI MAY HAVE BEEN GENERATED."
    - This has been identified as being too weak.
    - Recommend moving out of Recommended Actions section and changing to "EARTHQUAKES OF THIS SIZE OFTEN GENERATE DANGEROUS TSUNAMIS."

- ACTION: Remove statements from Recommended Actions which are not actions and place them below (i.e., IT IS NOT KNOWN...).
  - Adjust PTWC actions from WCATWC message.
    - Identified by West Coast WCMs as not adding substance to message and potentially confusing readers (since west coast is on Pacific, should they be looking for PTWC messages?)
    - ACTION: Make this statement more generic – no need to specifically identify what PTWC is doing, only that Pacific areas outside WCATWC AOR should refer to PTWC message.
  - New ETA Sites to add to standard message.
    - Following the Samoa event, Oxnard WFO requested San Pedro be added to ETA list in standard product.
    - Juneau WFO requested Juneau be dropped and Ketchikan moved to Craig.
    - ACTION: Drop Juneau as ETA point and add San Pedro. Replace Ketchikan with Craig.
  - Jeff L. requested a set of table top exercises from TWC to exercise WFOs (Seattle in particular).
    - Paul W. indicated this may already be taken care of with WCATWC scenario repository on web.
- Rhoades provided an overview of the NWS TWC IT Modernization Project.
  - TWC Operations System (TOPS).
    - Common system architecture for both TWCs.
    - Technology improvements and standardization.
    - Common system documentation and processes.
    - Status – Completing and validating technical requirements. Developing business case and acquisition strategy.
  - NOAA Tsunami Portal.
    - Single authoritative source for NOAA Tsunami products and information.
    - Customized views for registered users.
    - Additional graphical products and formats.
    - Status - Completing and validating technical requirements. Prototype to be completed by May 2010.
  - Tsunami Forecast Model Applications.
    - Currently SIFT and ATFM.
    - Optimizing models for CPU multiprocessing.
    - New forecast models under development and validation.
    - Status – Parallelizing ATFM code; transitioning SIFT to operations.
  - Enhanced Research capability.
    - Online access to research.
    - Collaborative.
    - Web based.
    - Status – Defining concept for web enabled research capability.
  - What architecture? Still undetermined.

- How to get input from all stakeholders?
  - ACTION: Once tsunami.gov portal is prototyped, request input from WCS members.
- See NEIC website as nice example of portal (Jim).

#### NTHMP Strategic Plan WCS Measure and Milestone Status

- Annual table top exercise by 2010.
  - LANTEX09 completed.
  - LANTEX10/PACIFEX10 planned for March 24, 2010.
  - Done - PW
- Develop decision support tools for emergency responders by 2013.
  - Development of tsunami.gov portal started in 12/09.
  - Portal will centralize real-time warning and forecast information as well as link to mitigation products such as evacuation maps.
  - Portal will also provide environment for Emergency Management to share information during an event.
  - Jim: CISM also provides decision support.
  - Laura: Plan more secure site? Yes –PW.
  - Would portal have tools to create exercises? No – PW.
  - Could also include official product improvements, telecons during events, etc.
  - Will this include a model for projecting impacts? Likely to be handled separately through PMEL research efforts.
- All states with high/very high hazard create high-level structure to address tsunami response by 2012.
  - Status of High/Very High hazard states and territories:
    - Hawaii – Yes: TTRC is set up but not active for several years.
      - Laura: may restart the mitigation component of the TTRC.
    - California – Yes: California Tsunami Steering Committee active.
    - Oregon – Yes: Coastal Fire Chiefs Group.
    - Washington – Yes: State/Local Tsunami Work group is in place, may be expanding.
    - Alaska – No: Plans to organize group.
    - Puerto Rico – Yes: TTRC for PR.
    - USVI – Not present during meeting but reported that Yes, a Territorial Working group has been set up.
    - Am. Samoa – No: Plans to develop.
- Increase percentage of monthly TWC comms test responses to 90% by 2013
  - Monthly comms. tests go to primary recipients (WFOs, state WPs, FAA, USCG, military).
  - In the Pacific AOR, TsunamiReady communities are also included.
  - Should new TsunamiReady communities be added to the comm. test regime?
    - Usually reached by FAX or email in tests.
    - Doesn't necessarily test comms used in an actual warning.

- Testing all TR communities may become unpractical as number of communities rise.
  - Highlights community's participation in Tsunami Warning System and keeps the hazard on the front burner for communities involved in testing.
- New TsunamiReady guidelines give credit for participation in the TWC monthly tests.
- No decision reached on inclusion of future TsunamiReady communities in tests. TWCs will examine the pros and cons of including the communities in the tests. For now, they will continue to be added when requested which is status quo.
- 2009 results:
  - 90% success for Atlantic
  - 87% success for Pacific
- Conduct annual E2E comms test of the TWS.
  - Alaska and northern CA now.
  - Continue to attempt to grow by aligning tests with National Awareness Week and by pointing out benefits through releases.
  - May not meet goal for entire country – Oregon No, Washington No.
  - State EAS chairs need to retire before this will happen in many states.
- Develop post-event review process by 2009.
  - Two post tsunami warning surveys developed by Walter Diaz and Jim Goltz in 2009 (one for general public and one for emergency mgmt.).
  - Survey was unofficially tested by two groups in American Samoa during 11/2009 surveys.
    - Survey assumed warning reached shore prior to wave.
    - Survey prevented frank interchanges.
  - The 2009 surveyors suggested that the survey be converted to a web-based document and carried out via internet after warnings. TWCs could point to the survey on their front pages immediately after a warning cancellation.
  - Christa: use USGS Did you feel it site as prototype for web survey.
  - ACTION: Approach NTHMP CC with proposal to develop a plan for NTHMP to respond to tsunamis and tsunami warnings.
- Conduct post-event reviews within one year of a tsunami warning.
  - NWS performing assessment of Samoa warning.
  - Should be complete by Spring 2010.
- Develop inventory of local warning dissemination capabilities by 2010.
  - MES survey for local emergency mgmt. to be executed in 2010 will include questions to determine these capabilities.
  - Should be complete by start of 2011.
  - ACTION: co-chairs work with MES to ensure data is collected and then compile the results to a baseline figure.
- Develop inventory of local warning reception capabilities by 2010.
  - MES survey for local emergency mgmt. to be executed in 2010 will include questions to determine these capabilities.
  - Should be complete by start of 2011.

- ACTION: co-chairs work with MES to ensure data is collected and then compile the results to a baseline figure.
- Annually increase to baseline developed above by 10%.
  - To be addressed once baselines are determined by surveys.
- Complete 90% of action items from subcommittee meetings.
  - Over 90% of Action Items from 2008 meeting completed.
- Conduct one in-person meeting per year.
  - No in-person meeting in 2009 due to change of Annual Meeting schedule in NTHMP Rules of Procedure.
  - Next meeting to be held prior to next Annual Meeting.
- Revise Terms of Reference to implement Strat. Plan measures and milestones by 2009.
  - Done in November, 2008.
- Assess the number of tsunami threatened communities by 2012.
  - WCS not lead subcommittee on this – MES has lead. Will assist as requested.
  - Jen – This is complete.
- Are any NTHMP funds needed to complete FY10/11 WCS measures and milestones (separate from regular state grants)?
  - Jim: No contingency fund to send people to survey following tsunami events. For administration of questionnaire, for example. Natural Hazards Research Center used to have travel funds set aside for quick response grants.
  - Jen: NTHMP set aside \$100K for post-event response.
  - Chris M: \$25K given to NHRC.